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## U. S. DEPARTMENT OF AGRICULTURE.

BUREAU OF SOILS.

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### DESCRIPTIONS OF SOIL TYPES ESTABLISHED AND CHANGES IN CLASSIFICATION SINCE THE PUBLICA- TION OF BULLETIN 78.

#### CHANGES IN CLASSIFICATION.

Transfer of the Berks series from the Piedmont Plateau province to the Appalachian Mountain and Plateau province.

Transfer of the Montalto series from the Appalachian Mountain and Plateau province to the Piedmont Plateau province.

The soil mapped as Oktibbeha silt loam in Oktibbeha County, Miss., has been changed to Pheba silt loam.

The soil mapped as Alamance silt loam in Alamance County, N. C., and now known as York silt loam, has been changed back to the Alamance silt loam, as originally mapped.

The soil mapped as Cecil stony loam in Adams County, Pa., has been changed to Montalto stony loam.

#### NEW TYPES ESTABLISHED.

##### ATLANTIC AND GULF COASTAL PLAINS PROVINCE.

##### SANDS.

*Scranton sand*.—The surface soil consists of 3 or 4 inches of ashy to dark-gray sand, usually grading into sand of a coffee-brown color. The subsoil, beginning at depths ranging from 8 to 12 inches, is a white medium textured sand, compact and usually saturated with water. The surface is quite rich in organic matter. Saw Palmetto is a conspicuous plant. The type occurs as poorly drained flat areas near streams or "bays," and requires ditching to fit it for cultivation. It occupies an intermediate position between the Norfolk and the Portsmouth sand. Reclaimed areas give rather poor results with cotton, but better yields of corn and oats. (Bullock County, Ga.)



*Scranton loamy sand*.—This type consists of a dark-gray to black sand or loamy sand rich in organic matter, resting, at an average depth of about 10 inches, on a compact light-yellow material of about the same texture as the soil. This is in turn underlain at 20 to 30 inches by light-yellow sticky sand to sandy clay, sometimes slightly mottled with drab and red. The surface is flat and the underdrainage poor, the subsoil being nearly, or quite, saturated throughout a good part of the year. Ditching is necessary to bring the land into proper condition for cultivation. With moderate fertilization a bale of cotton per acre has been secured. Sea-Island cotton makes a rank growth, but yields rather lightly. Corn does quite well, as do also sugar cane and a number of vegetables. (Bullock County, Ga.)

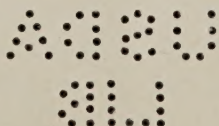
## FINE SANDS.

*Bienville fine sand*.—This type consists of a surface soil of light yellowish gray medium to fine sand 8 inches deep, underlain to a depth of 36 inches by orange-colored sand. It occurs as low ridges in the alluvial bottom lands, but is not subject to overflow. The topography is almost level. Very little of this type is cultivated. It should prove a valuable soil for early truck. (Ellis County, Tex.)

*Susquehanna fine sand*.—The surface soil, to an average depth of about 24 inches, is a rather loose fine sand, gray in the immediate surface portion and pale yellow below. The subsoil is a reddish to mottled, red, yellow, drab, and gray plastic clay. The type generally occurs on the crests of ridges and knolls. The natural drainage is excessive. With heavy fertilization and the incorporation of large quantities of organic matter fair crops of cotton, corn, and forage are secured. Melons, sweet potatoes, and a number of other vegetables do well. (Lauderdale County, Miss.)

## SANDY LOAMS.

*Ruston sandy loam*.—The surface soil, to a depth of about 6 to 15 inches, consists of a gray loamy sand. The subsoil is a fairly friable yellowish-red sandy clay, the color being intermediate between the red of the Orangeburg and the yellow of the Norfolk soils. Iron concretions and ironstone fragments are encountered here and there on the surface and throughout the subsoil. The surface is predominately rolling, probably averaging rougher than either Orangeburg or Norfolk areas. Grayish mottling is sometimes encountered in the lower portion of the subsoil and frequently the subsoil is less friable than that of the Orangeburg or Norfolk soils. The type is adapted to about the same crops as the Norfolk sandy loam, but gives usually somewhat lighter yields. Cotton, corn, peanuts, and forage crops give good results under careful treatment. (Pike County, Ala.)





*Greenville coarse sandy loam.*—The surface soil of this type varies from a coarse loamy sand to a heavy sandy loam, the immediate surface portion usually being much coarser than the subsurface. In color there is a range from dull reddish brown to a pronounced reddish brown. The subsoil is a dark reddish brown to dark-red sandy clay of a rather stiff, firm structure and a remarkable capacity for holding moisture. The topography varies from undulating on interstream divides to sloping along the descents to streams. In the latter situation the soil loses the series characteristics and becomes more like the Orangeburg soil. With good drainage and power to hold moisture this is a soil of high agricultural value, especially when the coarse texture of the surface soil is taken into consideration. Much of this land has been in cultivation 50 years or more, and is still producing good yields of cotton, corn, oats, cowpeas, and sorghum. (Pike County, Ala.)

*Hoffman coarse sandy loam.*—The surface soil is a gray coarse sand, carrying generally considerable quantities of small gravel. The subsoil is a rather stiff sandy clay, mottled bright red, white, and drab. The type occurs mainly as small knolls. On account of its open character it does not hold moisture well and only moderate yields can be expected except where heavy applications of fertilizers and organic manures are used. (Bullock County, Ga.)

#### FINE SANDY LOAMS.

*Hoffman fine sandy loam.*—The surface soil consists of a light-gray to yellowish fine sand to loamy fine sand from 12 to 15 inches deep. The subsoil is a rather stiff, plastic sandy clay, distinctly mottled purplish and pinkish red, gray, and yellow. Some pebbles and fragments of iron-cemented sandstone occur here and there. The topography is somewhat broken, being usually rougher than that of the Norfolk fine sandy loam. The type is generally considered a rather poor soil, although with careful handling much of it gives fairly good results with cotton, corn, peanuts, sweet potatoes, cowpeas, and velvet beans. (Bullock County, Ga.)

*Pheba fine sandy loam.*—The surface soil is a gray to light-brown fine sandy loam from 6 to 10 inches deep. The subsoil is a yellowish-brown heavy fine sandy loam, gradually passing into fine sandy clay or silty clay. The lower subsoil is usually mottled with reddish-yellow and gray colors. A heavy clay substratum is encountered at 3 to 6 feet. The surface is flat to gently rolling or undulating. Ditching is necessary in some of the more nearly level areas. The type is deficient in organic matter. Cotton, corn, peanuts, oats, rye, cowpeas, soybeans, and sorghum give very good results with proper treatment. (Noxubee County, Miss.)



*Plummer fine sandy loam.*—The surface soil is a gray loamy fine sand sometimes faintly mottled with brown. At 8 to 18 inches a compact loamy fine sand, gray or streaked with brownish or yellowish colors, is encountered. Below this is found a mottled gray and yellow fine sandy clay or sticky fine sand, with pockets or layers of yellowish plastic fine sandy clay. On account of its flat surface and low position the type is usually poorly drained. Cypress, pine, and cabbage palmetto constitute the main timber growth. The soil is typically developed in the flatwoods country of the Coastal Plains. Very little has been utilized for farming, but with drainage oats, corn, and sugar cane would probably give good results. Vegetables, especially onions, lettuce, and cabbage, would also prove profitable. (Jacksonville area, Fla.)

The soils of the Plummer series belong in the key to the soils of the Coastal Plains province, under the heading: Piedmont-Appalachian Material—Drainage poorly established—Gray soil (attached to the Lufkin leg)—Gray subsoil mottled with yellowish streaks—Pockets and layers of clay material common to lower subsoil—Flatwoods of Atlantic and East Gulf Coastal Plains.

*Durant very fine sandy loam.*—This soil type consists of a yellowish-brown very fine sandy loam, underlain by a pale yellowish gray very fine sandy loam slightly heavier than the surface soil. The soil varies in texture from a heavy very fine sandy loam to light loam. Thin layers of limestone occur throughout the type and fragments of this rock are occasionally scattered over the surface. The topography is broken and hilly, as the surface is cut by numerous V-shaped valleys. Little of this type is under cultivation. The greater part is used for grazing, for which purpose it is best adapted. The areas are generally too hilly and badly eroded for tillage. (Ellis County, Tex.)

#### SILT LOAM.

*Ruston silt loam.*—The soil of this type to an average depth of about 7 inches is a gray to grayish-brown silt loam. In places the content of very fine sand is high. The subsoil is a yellowish-red to dull-red silt loam, grading quickly into a silty clay loam. In the lower subsoil the material is mottled with gray and the structure is slightly plastic. The type occupies undulating to gently sloping or gently rolling country. With moderate applications of fertilizers and organic manures cotton, corn, oats, and forage crops give good yields. (Lauderdale County, Miss.)

#### CLAY LOAMS.

*Greenville gravelly clay loam.*—The surface soil to a depth of 4 or 5 inches is reddish-brown heavy sandy loam with sufficient clay to impart the working qualities of a friable clay loam. In places the



texture is decidedly a clay loam. The subsoil is a reddish or dark-red sandy clay, frequently becoming heavier with increase in depth. Iron concretions are abundant over the surface, in the soil, and less so in the subsoil. The surface configuration ranges from undulating to gently rolling, giving good surface drainage without destructive erosion. Cotton, corn, oats, rye, and forage crops give very good results. (Sumter County, Ga.)

## CLAYS.

*Durant clay.*—This soil consists of 9 inches of dark-brown to almost black clay. The subsoil from 8 to 36 inches is a stiff, heavy, pale yellowish-drab or sometimes dark-bluish clay. Scattered over the surface and throughout the soil and subsoil are lime concretions or gravel. The type is derived from marly clays of the Eagle Ford formation. The topography varies from level to gently rolling. Cotton yields one-third to three-quarters bale per acre, corn 30 to 40 bushels, and oats 40 to 50 bushels. (Ellis County, Tex.)

*Ellis clay.*—This soil, to a depth of 6 inches, is a yellowish-brown clay. The subsoil is a yellowish heavy plastic clay to a depth of 3 feet or more. In many places there are scattered over the surface and through the soil and subsoil fragments of hard, brown limestone. The soil is very sticky and plastic when wet and bakes on drying. The surface features vary from rolling to hilly or even broken. The broken areas are badly eroded. The type is derived from the marly clays of the Eagle Ford formation and from the Taylor marl. Because of the difficulty of cultivation, owing to the heavy texture and uneven surface, the greater proportion of the type is not cultivated. It is better suited to cotton than to any other crop, yielding from one-quarter to one-half bale per acre. (Ellis County, Tex.)

The proper place for the Ellis series in the key to the soils of the Coastal Plains province is under the heading "Calcareous material," attached to the drainage well established leg, as follows: Yellowish-brown soil—Yellow subsoil—Derived from marly clays—Surface hilly.

*Pheba clay.*—The surface soil consists of 8 inches of light-brown clay or silty clay. Over this there occasionally is a shallow covering of fine sandy material. The subsoil is a rather plastic clay of brownish or yellowish color, mottled at lower depths with gray. The surface drainage of the flatter areas is frequently poor. The type is usually deficient in organic matter and is inclined to bake. It is best adapted to wheat, grass, and forage crops. Cotton, corn, and oats give fair returns. (Noxubee County, Miss.)

*Henderson stony clay.*—This type consists of a surface soil of greenish-gray, sticky clay, carrying varying proportions of fragmental limestone. There usually is a thin mantle of fine sand over



the surface of the less stony areas. The subsoil is very heavy and tenacious. In the lower part the decomposed limestone or a marly material occurs. The soil is derived from Tertiary limestone. It has not been seen under cultivation, and probably would prove of low agricultural value on account of the intractable character of the material. (Pike County, Ala.)

The Henderson series belongs in the key to the Coastal Plains province as a leg attached to the Sumter soils, under the heading "Calcareous material," drainage well established, as follows: Yellow soil—Greenish-gray, sticky subsoil—Weathered limestone fragments and marly material abundant.

*Houston stony clay.*—This type consists of 4 to 15 inches of dark-brown or black clay, underlain by chalky white limestone. Limestone fragments of varying size are scattered over the surface. The type is eroded, and small outcrops of the parent rock are frequently seen on the hillsides and on the summits of knolls. Owing to the shallow soil the type does not stand drought well, and the yields depend largely upon the season. In years of normal rainfall good crops of cotton, corn, wheat, and oats are secured. (Ellis County, Tex.)

*Lauderdale stony clay.*—This type consists of a yellow to nearly white, stiff clay carrying on the surface and throughout the soil to 36 inches from 25 to 60 per cent of stone fragments, consisting of rather soft white to yellowish or reddish siliceous rock, of locally cemented reddish sandstone, and of a hard siliceous rock resembling quartzite. There is no distinct line of demarcation between soil and subsoil. The type is derived from the Tallahatta buhrstone formation of the Claibourne stage. The type is locally called "white hills" and "white rock land." It chiefly occupies the crests of narrow, high, winding ridges and the tops of hills, though occasionally developed on lower slopes. The topography is too rough for profitable farming. (Lauderdale County, Miss.)

The Lauderdale series belongs in the Coastal Plains province under the heading: Piedmont-Appalachian material—Drainage well established—Gray soils—Mottled tenacious clay subsoil (changed to subsoils plastic). Here it will connect as a separate leg—Subsoil white—Residual from soft, siliceous, gray rock (Claibourne formation).

#### SUBORDINATE TYPES.

*Sumter stony sandy loam.*—The surface soil, with a depth of about 5 to 12 inches, is a yellowish-gray to yellow sandy loam. The subsoil is principally composed of partially weathered limestone of the Vicksburg-Jackson formation, the interstitial material being a yellowish sandy clay. The surface is strewn with limestone and chert



fragments. These fragments also are usually so plentiful as to interfere materially with cultivation. The type occupies ridges and slopes where erosion has exposed the underlying rock. Cultivated areas give good yields of the general farm crops. Peaches do especially well. (Sumter County, Ga.)

The position of the Sumter series in the key to the soils of the Coastal Plains is as follows: Calcareous material—Drainage well established—A third leg reading: Yellow soil—Yellow subsoil—Fragments of weathered Vicksburg-Jackson limestone common.

*Susquehanna stony sandy loam.*—The surface soil is a grayish or grayish-brown medium to coarse sand to sandy loam. The subsoil is usually a stiff, plastic red or reddish-yellow clay, with little sand. It is often mottled with gray. In places the lower subsoil is composed of a reddish micaceous sand with very little clay. The type is characterized by its rough topography and the presence of an abundance of ironstone and ferruginous gravel on the surface. It has little value except for Bermuda pasturage. (Pike County, Ala.)

*Greenville coarse sand.*—The surface soil is a brown to reddish-brown coarse loamy sand of more coherent structure than the Norfolk and Orangeburg coarse sand. The subsoil is usually very similar to the soil in texture, averaging a little lighter. It has usually a brighter red color than the surface soil. The type is often typically developed on the lower slopes of divides on which the heavier members of the Greenville series occur. For such a coarse textured soil, the agricultural value is surprisingly high. This is due largely to a greater power of conserving moisture than less ferruginous, lighter colored coarse sands. This soil is not well adapted to general farm crops, but cotton and oats give fair results. Watermelons, sweet potatoes, and a number of vegetables do particularly well.

#### PIEDMONT PLATEAU PROVINCE.

##### SOUTHERN PIEDMONT.

*Durham fine sandy loam.*—The surface soil is a gray to yellowish fine to medium sandy loam, 8 to 10 inches deep. The subsoil is a friable yellow fine sandy clay. The topography is predominately undulating to gently rolling and the drainage is good. The type is derived principally from fine-grained granite and gneiss. It is well suited to bright tobacco, peanuts, sweet and Irish potatoes, garden peas, cowpeas, crimson clover, watermelons, and cantaloupes. With fertilization rye, corn, oats, and cotton give fair to good yields. (Granville County, N. C.)

*Mecklenburg sandy loam.*—The surface soil, to a depth of 6 to 12 inches, consists of a dark-brown to reddish-brown light loam to sandy loam. The subsoil is a yellowish-brown to ochreous-yellow,



heavy, plastic, impervious clay, underlain at 20 to 36 inches by disintegrated rock of the parent diorite, micadiorite, gabbrodiorite, or metagabbro. Hardwoods, principally oak and hickory, constitute the chief growth of forested areas. Under ordinary methods of cultivation corn yields from 15 to 30 bushels per acre and oats from 15 to 40 bushels. Wheat, cowpeas, and soy beans do fairly well. (Cabarrus County, N. C.)

The position of the Mecklenburg series in the key to the Southern Piedmont Plateau province is as follows: Igneous and metamorphic rocks—Diorite and diabase—Red soils—Yellow plastic subsoils—Disintegrated rock substratum.

*Iredell loam.*—This type consists of light-brown heavy fine sandy loam to light loam, 4 to 8 inches deep, underlain by a yellowish-brown, impervious, waxy, sticky clay, passing at 20 to 30 inches into disintegrated rock. Black iron concretions are common over the surface and throughout the soil. The topography is flat or undulating to gently rolling. Surface drainage is good, except in the more nearly level areas, which need ditching. The type is derived chiefly from diorite. Blackjack oak is a prominent tree, although other oaks, some cedar, and old-field pine are seen. The type is highly prized for oats, cotton, wheat, corn, and grasses. (Cabarrus, Granville, and Mecklenburg Counties, N. C.)

*Mecklenburg loam.*—The surface soil consists of 6 to 8 inches of reddish-brown to red loam or light loam. The subsoil is a yellowish-brown or ochereous yellow plastic, tenacious clay, becoming more friable at a depth of 24 to 30 inches, owing to the presence of fragments of the parent rock. A mass of disintegrated rock is usually encountered within the 3-foot section. In places the subsoil resembles that of the Iredell soils, giving a section somewhat the appearance of Cecil material over Iredell. The topography is usually undulating to gently rolling and the surface drainage good. The characteristic timber growth is white, red, post, and blackjack oak, with considerable hickory and a sprinkling of cedar and pine. The type is well adapted to corn, cotton, oats, wheat, grass, and forage crops. From 15 to 30 bushels of corn, 15 to 40 bushels of oats, and from one-half to 1 bale of cotton per acre are ordinary yields. (Mecklenburg County, N. C.)

*Alamance silt loam.*—This type consists of a yellowish-gray to white, floury, rather compact silt loam, 6 or 8 inches in depth, overlying a pale yellow heavy silt loam, which quickly grades into a rather dense yellow silty clay. Fragments of the parent rock are scattered over the surface, sometimes in sufficient abundance to develop patches of slate loam. The subsoil does not have the greasy feel that is frequently noticed in the subsoil of the York soils. The



type occupies nearly flat to rolling topography. White oak, post oak, blackjack oak, and pine constitute the principal vegetation. The soil is low in organic matter and is inclined to compact. It is considered an excellent grain soil, and when properly supplied with vegetable matter and moderately fertilized good yields of corn, cotton, and forage crops are secured. (Cabarrus, Granville, and Mecklenburg Counties, N. C.)

*Georgeville silt loam.*—The surface soil is a reddish-brown, rather heavy silt loam, 4 to 8 inches deep. The subsoil is a red heavy clay, underlain to about 36 inches by partially decomposed rock, which in turn is underlain by hard bed rock at depths of 40 to 50 inches. The type is derived from slate rocks closely related to those giving the Alamance soils. The reddish color is believed to be due to the higher content of iron-bearing minerals. The topography is very undulating to broken along streams. The timber growth consists principally of oak, hickory, dogwood, and pine. This is a better agricultural soil than the Alamance silt loam. It is well suited to oats, wheat, corn, and forage crops. Cotton matures late and is sometimes killed by frost. (Cabarrus and Granville Counties, N. C.)

The Georgeville series belongs in the key to the soils of the Southern Piedmont. It should be attached to the Alamance series leg—Carolina slates—Reddish-brown soil and red subsoil.

*Mecklenburg clay loam.*—The surface soil consists of reddish-brown to red loam to clay loam, with an average depth of 8 inches. The subsoil is a yellowish-brown or ochereous-yellow, stiff, plastic clay. At 18 to 24 inches the partially decomposed parent rock is encountered. Iron concretions occasionally occur on the surface. The topography varies from undulating to gently rolling. Along stream slopes it is sometimes slightly broken. Drainage is good, except in some of the more nearly level areas. White, post, red, and blackjack oak, hickory, pine, and cedar constitute the usual forest growth. Cotton yields from one-half to 1 bale per acre; corn, from 20 to 40 bushels; oats, from 20 to 40 bushels; and wheat, 12 to 20 bushels per acre. Clover, vetch, soy beans, cowpeas, and Johnson grass do well. (Mecklenburg and Cabarrus Counties, N. C.)

*Alamance slate loam.*—The surface soil, to an average depth of about 8 inches, consists of a gray to nearly white silt loam, to which numerous small fragments of slate rock impart a gritty feel. In some places there is a thin layer of yellow silty clay subsoil, but usually the gray silt loam soil is underlain by the slate. Fragments of this rock up to an inch or more in diameter are present in the soil in sufficient quantities to interfere materially with cultivation. The topography varies from gently rolling to rolling or sometimes broken. Much of the type is covered with valuable forest, consisting principally of



oak, pine, and hickory. Owing to the rolling topography, open structure, and the proximity of bed rock to the surface the drainage is usually excessive. The average yields are low, but where the soil is less slaty and the depth to underlying rock deeper than normal moderate yields of cotton, wheat, corn, and oats are secured. Certain varieties of apples, pears, and peaches do well. (Cabarrus County, N. C.)

*Iredell stony loam*.—The surface soil of this type consists of 6 inches of greenish-brown loam. The subsoil is somewhat variable but is prevailingly a yellowish-brown silty clay loam, quickly passing into a plastic, sticky reddish-yellow heavy clay, which in turn grades into greenish-brown material of like character. At about 24 inches partially decomposed greenish rock is found. Fragments of schistose rocks, of diorite, and sometimes of quartz are scattered over the surface and disseminated throughout the soil in sufficient quantities to hinder cultivation. Rock outcrops are also frequent. The type is derived from andesite, altered andesite, and diorite. Of the crops ordinarily grown, wheat, oats, and grass give the best results. (Granville County, N. C.)

#### NORTHERN PIEDMONT.

##### COARSE SAND.

*Granville coarse sandy loam*.—The surface soil is a grayish coarse sandy loam, which usually at a depth of about 5 inches becomes pale yellow in color and slightly heavier in texture. The subsoil is a yellow sandy clay, sometimes mottled with gray and occasionally including, especially in the lower depths, a plastic clay of Indian red color. A typical section is very similar to that of the Durham coarse sandy loam, though differing in the frequent occurrence of Indian red and grayish colored clay in the lower subsoil. The subsoil also is somewhat more plastic than that of the Durham coarse sandy loam. Galled spots, representing areas from which the surface soil has been washed off, are of common occurrence. In such areas the soil is usually a plastic clay, of Indian-red or grayish color. The topography is gently undulating to rolling or slightly hilly, and the drainage good to excessive. The type is derived from Triassic sandstone. The agricultural value is about the same as that of the Durham coarse sandy loam. Good yields of a fine grade of bright yellow tobacco are secured. Corn, oats, peanuts, sweet and Irish potatoes, forage crops, and a number of vegetables do well. (Granville County, N. C.)

The soils of the Granville series belong in the key to the soils of the Piedmont Plateau province. They fall under "yellow subsoil" of the Lansdale leg, by adding "deep subsoil, mottled gray and Indian red (Penn material)—Granville."



## GLACIAL AND LOESSIAL PROVINCE.

## SANDS.

*Miami sand.*—The soil is a yellowish to brownish-gray medium sand, about 8 inches deep, underlain by lighter colored, loose, incoherent sand of the same texture. Comparatively little stone occurs in this type, though a small quantity of cobbles and gravel is found in local areas. The topography is usually rolling and sometimes hilly. The type occurs not infrequently in the form of moraines. The drainage is so free as to make the soil droughty and the agricultural value is consequently lower than in the case of the Miami types of finer texture. In moist seasons such crops as rye, corn, and potatoes produce fair yields. (Waukesha County, Wis.)

## SANDY LOAMS.

*Plainfield sandy loam.*—The surface soil of this type is a brown loamy sand to sandy loam, 16 or 18 inches deep. The subsoil becomes lighter in color and somewhat coarser in texture as depth increases and at about 30 inches is usually a yellow sand possessing but little coherency. The material often extends to depths of many feet. For the most part it has been laid down by rushing glacial waters rather than as present-day alluvium, and occurs in broad filled-in valleys along the streams and as glacial outwash in the glaciated region of the Great Lakes and also in the driftless area of Wisconsin. It has a level to slightly undulating topography. While subirrigated the soil is now above all overflow. It produces light yields of corn, hay, rye, and some of the other general farm crops. Dairying is an important industry on some of the type. (Iowa County, Wis.)

## FINE SANDY LOAMS.

*Plainfield fine sandy loam.*—The surface soil varies from yellowish to brownish in color. In texture it is a fine sandy loam. It extends to a depth of about 10 inches. The subsoil is usually somewhat looser and coarser than the overlying soil, and small gravel is usually present. The type occurs as nearly level to gently undulating outwash plains, the materials forming which are often many feet in depth. The underdrainage is free. In seasons of a moderate amount of moisture the type produces fair crops of potatoes, corn, and other general farm crops. (Waukesha County, Wis.)

## LOAMS.

*Farmington loam.*—This type consists of a light-brown silt loam, from 6 to 10 inches deep, resting upon thin-bedded shaly limestone. The shallow soil contains more or less angular fragments of limestone, together with a small percentage of glacial gravel and stones, though the possibilities of cultivation are rather more dependent



upon the depth to the limestone than upon the presence of loose stone. The topography is nearly level and drainage is good. The type occupies valley positions where a large part of the glacial material originally present has been swept away by glacial streams. The soil is partly residual. This type is well adapted to potatoes, beans, corn, oats, and clover, depending upon the depth to the underlying rock. (Ontario County, N. Y.)

The Farmington series belongs in the Glacial and Loessial province, under the heading, "Thin glacial material," and under the subdivision, "Limestone material"—"shaly limestone," attached to the pendant under "light-brown soil"—substratum of limestone.

*Plainfield loam.*—This type consists of a light-brown medium loam, about 10 inches deep, underlain by a yellowish or yellowish-brown subsoil of slightly heavier texture, containing a small quantity of sand and fine gravel. The gravel content increases below 18 inches, and the subsoil frequently grades into a gravel bed. The type is easy to cultivate and the presence of the underlying gravel gives good drainage. In prolonged dry seasons crops are liable to suffer somewhat from lack of water, but in seasons of normal rainfall the type is a good general purpose soil and is particularly well adapted to corn and potatoes. The topography varies from level to somewhat undulating. (Waukesha County, Wis.)

#### SILT LOAMS.

*Plainfield silt loam.*—This type consists of a light-gray to light-brown silt loam, varying from 8 to 12 inches in depth, underlain by a yellowish-brown heavy silt loam or clay loam subsoil. At from about 18 inches to 3 feet fine gravel is usually found. This underlying gravel provides good subdrainage, so that the soil can be cultivated under a rather wide range of moisture conditions. The topography varies from nearly level to somewhat undulating and the type usually forms outwash plains. It is a fairly good general farming soil and produces moderate yields of ordinary crops, including grains, root crops, etc. (Waukesha County, Wis.)

#### SUBORDINATE TYPES.

*Miami gravel.*—The Miami gravel consists of a gray to brown gravelly loam or slightly sandy loam. Cobblestones, gravel, and boulders form a large percentage of the material. The coarser material is made up of a variety of angular and sometimes rounded fragments of granitic or gneissic rocks and of limestone. The topography is usually hummocky and often quite largely formed of the rounded hills and knolls of moraines. In many localities the type is subject to considerable erosion and the agricultural uses are limited. Its principal value is for pasturage. (Waukesha County, Wis.)



*Miami gravelly sandy loam.*—This type is a light-brown to grayish-brown sandy loam, containing a small quantity of fine and medium sized gravel and stone, underlain by a subsoil containing enough clay to make it slightly sticky. The soil proper has a depth of about 10 inches. At 18 to 24 inches the gravel content increases and there are not infrequently numerous cobblestones and boulders. The topography varies from undulating to rolling and somewhat hilly. The surface drainage is always good. Some artificial drainage is necessary in localities where the subsoil is heaviest and the stone content least. The type is subject to some erosion. It is a very fair soil. Oats and rye are well adapted to the type. Clover is one of the more important crops. (Waukesha County, Wis.)

*Waukesha gravelly loam.*—This type consists of a brownish to black loam, 8 or 10 inches deep, resting upon a subsoil somewhat lighter in color and containing more fine gravel and sand. At a depth of 18 inches to 2 feet the gravel increases in quantity, often occurring as beds showing marked stratification. The topography varies from level to undulating or slightly rolling. The type is best adapted to such crops as rye and oats, though in seasons of considerable rainfall corn gives fair yields. (Waukesha County, Wis.)

#### GLACIAL LAKE AND RIVER TERRACE PROVINCE.

##### SANDY LOAMS.

*Chenango sandy loam.*—This type consists of light-brown sandy loam, about 6 inches deep, overlying a yellowish-brown somewhat incoherent sandy loam or loamy sand. Small gravel is found at the surface and in the subsoil. The type occupies stream terraces above danger of overflow, and is well suited to the production of truck crops and small fruit. (Erie County, Pa.)

##### LOAMS.

*Chenango loam.*—The Chenango loam is characterized by a light-brown or reddish-brown loam soil, about 8 inches deep, underlain by a somewhat lighter and occasionally mottled loam or silty loam subsoil. Fine shale fragments and rounded gravel occur in the soil and subsoil. The type is found on stream terraces. The gravel in the subsoil usually makes the type well drained. The flatter areas are sometimes improved by tiling. This is a good soil for general farm crops and for cabbage and potatoes. Fruit does well where topographic and climatic conditions are suitable. (Erie County, Pa.)

##### SILT LOAMS.

*Chenango silt loam.*—This type consists of about 9 inches of brown silt loam, overlying a silt loam or silty clay loam subsoil of somewhat



lighter color. Variable quantities of fine gravel occur in soil and subsoil. The type occupies terraces lying above overflow along streams, and the topography is level to slightly undulating. The soil is easily cultivated and is well adapted to corn, grain, and grass crops, and to pear and apple orchards where suitably located. (Erie County, Pa.)

#### SILTY CLAY LOAMS.

*Clyde silty clay loam.*—This type is composed of a dark-brown to black silty clay loam, ranging from 6 to 10 inches in depth, underlain by a drab or gray usually mottled clay subsoil. The topography is level and the drainage is naturally poor, so that ditching is necessary before crops can be profitably grown. When reclaimed the type is strong and productive and good yields of corn and general farm crops are secured. Such crops as cabbages and onions are also very well suited to this type. Timothy and redtop produce from 1 to 2½ tons per acre on reclaimed land. (Waukesha County, Wis.)

*Livingston silty clay loam.*—The soil of this type is a brown to light-brown heavy loam or silty clay loam, about 10 inches deep. The subsoil consists of a dense silty clay loam or clay of mottled gray color. The topography is nearly level to gently undulating and the natural drainage is inadequate both on account of the unfavorable surface topography and the impervious nature of the subsoil. The principal forest growth consists of different species of oaks, hickory, and some elm. When well drained the type is adapted to corn, wheat, beans, and hay. (Ontario County, N. Y.)

#### LIMESTONE VALLEYS AND UPLANDS PROVINCE.

#### SILT LOAMS.

*Brooke silt loam.*—The surface soil is a light-brown mellow silt loam, 8 to 10 inches deep. The subsoil is a heavy tenacious clay, ranging in color from light brown to slightly reddish brown, occasionally mottled in the lower portion with grayish colors. The type occupies plateau areas, the tops of hills, and ridges. It is a very productive soil and is largely under cultivation. Corn yields from 60 to 100 bushels per acre; oats, 30 to 60 bushels; wheat, 18 to 30 bushels; and hay, 1½ to 3½ tons. Bluegrass, timothy, and clover thrive. (Washington County, Pa.)

*Pocahontas silt loam.*—The surface soil is a yellowish-gray to light-brown silt loam of friable structure, with a depth of 9 to 12 inches. The subsoil is a yellowish silty clay or silty clay loam. The type is derived from shales with some included limestone. Its topography is well suited to agriculture. Good yields of wheat, corn, cowpeas,



grass, and clover are secured. With proper management alfalfa would probably do well. (Cape Girardeau County, Mo.)

The Pocahontas series belongs in the Limestone valleys and Uplands province, as follows: On the Murrill leg, coming out directly under the description of the subsoil and above the colluvial slopes.

*Tilsit silt loam.*—The surface soil of this type is a pale-yellow to brownish-yellow silt loam. The upper 2 or 3 inches may have a gray color. The soil differs from the Hagerstown silt loam in being yellow rather than brown. There is present occasionally considerable quantities of fine and very fine sand. The subsoil is like the soil, a pale yellow to brownish-yellow soil, with a faint reddish tinge. At depths ranging from 10 to 24 inches the subsoil is slightly heavier than the soil and often has a somewhat lighter color. Below 24 inches the subsoil is mottled yellow, gray, and brown. It is derived from a fine-grained sandstone lying between beds of limestone in the Limestone Valleys and Uplands province. It is influenced more or less by material from the limestone. (Cape Girardeau County, Mo.)

The Tilsit series belongs in the key of soils to the Limestone Valleys and Uplands province on the Colbert leg, under limestone and sandstone, as follows: Brownish-yellow to gray soil—Brownish-yellow subsoil—Deep subsoil mottled yellow, brown, and gray—Tilsit.

#### SILTY CLAY LOAMS.

*Colbert silty clay loam.*—The surface soil is a grayish compact heavy silt loam to silty clay loam having an average depth of about 5 inches. The subsoil in the upper part is yellow heavy silty clay loam. This usually grades into plastic silty clay, the lower subsoil frequently being quite sticky and tenacious. The type is derived from pure limestone, or limestone including some sandstone. The topography varies from flat to gently undulating. Drainage is imperfectly established. The characteristic forest consists of red oak, post oak, blackjack oak, hickory, pine, and elm. The type is adapted to shallow-rooted crops, such as wheat and grasses. (Walker County, Ga.)

#### CLAYS.

*Pennington clay.*—This type consists of a yellow to light-brown clay of variable depth, resting on a subsoil of tough yellowish clay mottled with light blue. A thin covering of colluvial material is encountered in places. At present none of the type is used for agriculture. Throughout most of the year the soil is soggy from accumulation of seepage waters. It requires artificial drainage before any crops can be grown. (Rockcastle County, Ky.)

The position of the Pennington soils in the key to the Limestone Valleys and Uplands province is as follows: Attached to "limestone



and shale " leg, above " brown soil." Yellow soil—Stiff clay subsoil, mottled yellow and blue.

*Colbert stony clay.*—The surface soil is a gray to grayish-brown compact silty clay loam to silty clay, 4 to 6 inches in depth. The subsoil is very plastic, tenacious, sticky, yellow clay. Ledges and fragments of the limestone from which the type is derived are of very common occurrence. The type forms flat to undulating valley lands and some lower slopes bounding escarpments. Oak, cedar, and hickory constitute the principal forest growth. This is a very difficult soil to plow. It is best suited to the production of grass for hay or pasturage. (Walker County, Ga.)

#### APPALACHIAN MOUNTAINS AND PLATEAUS PROVINCE.

##### FINE SANDY LOAMS.

*Allen fine sandy loam.*—The surface soil is a brown to reddish-brown fine sandy loam, from 6 to 8 inches deep. The subsoil is reddish-brown to red compact heavy fine sandy loam. Rounded sandstone fragments are more or less abundant on the surface and are occasionally encountered in the soil. The type occupies level to sloping situations about the mouth of gorges. The soil consists of Decatur material mixed with Dekalb material washed from adjacent higher lands. The drainage is well established. Cotton, corn, oats, cowpeas, and sorghum give good results. (Walker County, Ga.)

The place of the Allen series in the key to soils of the Appalachian Mountains and Plateaus province is as a separate leg headed: Sandstone, shale, and limestone—Brown soil, red subsoil, mixed Dekalb and Decatur material.

*Westmoreland fine sandy loam.*—The surface soil is a brown to yellowish-brown fine sandy loam, averaging about 8 inches in depth. The subsoil is a lighter-colored heavy fine sandy loam to fine sandy silt loam or silty clay loam. The type occupies high plateau areas, mainly where the drainage is good to excessive. It is derived from fine-grained micaceous sandstone and is influenced to a variable degree by limestone material from associated limestones. It is a very good general farming soil, producing from 25 to 50 bushels of corn, 20 to 40 bushels of oats, and 10 to 15 bushels of wheat per acre. Grass gives only moderate yields. Vegetables do well. (Washington County, Pa.)

The position of the Westmoreland series in the key to the soils of the Appalachian Mountains and Plateaus province is attached to the Conasauga pendant, under the heading: "Shale and sandstone with some interbedded limestone"—Brown soil—Yellow friable subsoil—Sloping to rolling topography.



## LOAMS.

*Conasauga loam*.—This type consists of a light-brown silty loam, underlain at 12 to 15 inches by yellow silty clay loam to silty clay. It forms gently rolling valley lands. It is derived from interbedded fine-grained sandstone, shale, and siliceous limestone. It gives very fair yields of cotton, corn, oats, wheat, and forage crops. (Walker County, Ga.)

*Lickdale shale loam*.—The surface soil is a gray to light-brown silt loam, averaging about 6 inches in depth. The subsoil is a yellow silty clay, mottled with gray and dull-bluish colors in the lower portion. At depths from 12 to 24 inches the parent shale rock is encountered. Fragments of gray, olive, bluish, and brown shale are scattered plentifully over the surface and throughout the soil mass. The type occupies lower slopes, usually bordering stream bottom or terrace soils. It is kept in a soggy condition by seepage a good part of the year. On the other hand, it is subject to excessive drainage in dry periods. Chestnut, oak, hickory, and pine constitute the principal tree growth. Little of the type is used for agriculture. Grasses, such as redtop and meadow fescue and Japan clover, do well. (Rockcastle County, Ky.)

## SILT LOAMS.

*Allis silt loam*.—The surface soil of the Allis silt loam consists of 8 to 10 inches of light-brown to gray silt loam, containing small quantities of rounded gravel and soft shale fragments. This overlies a subsoil of gray sticky silty loam or clay loam. The surface soil is friable and cultivation is carried on without much difficulty. The topography is level to undulating, though drainage is usually poor on account of the heavy character of the subsoil. The soil of this type is derived from the intermixture of glacial material of foreign origin with residual material formed through weathering from the soft Salina shales. Most of the previously existing glacial drift has been removed through glacial stream erosion. The type is adapted to the production of corn, oats, wheat, and hay, good yields being secured. (Ontario County, N. Y.)

*Conasauga silt loam*.—This type consists of a light-brown silt loam underlain by a yellow silty clay loam to silty clay. It occurs as level to gently rolling valley lands. The type is derived from the Conasauga formation or from similar rocks. Under proper management good yields of corn, oats, wheat, grass, and forage crops are secured. Cotton also does fairly well. (Walker County, Ga.)

*Westmoreland silt loam*.—The surface soil is a grayish-brown to brown mellow silt loam, 7 to 12 inches deep. The subsoil is yellow-



ish-brown to yellow silty clay loam to silty clay, usually becoming heavier in texture and lighter in color with increasing depth. The type is derived from shales and fine-grained sandstone, with interbedded limestone and calcareous shales. The topography ranges from rolling to quite steep, many areas being so steep as to erode if cultivated. In the main the soil has excellent drainage. It is, though, sufficiently retentive of moisture. The principal trees in forested areas are oak, hickory, locust, black gum, maple, and beech. This type is admirably suited to the production of corn, oats, wheat, grass, potatoes, apples, peaches, plums, cherries, and berries. (Washington County, Pa.)

#### SILTY CLAY LOAMS.

*Armuchee silty clay loam.*—This type consists of a brown to reddish-brown silty clay loam, 4 to 6 inches deep, resting on a red silty clay. The type occupies moderately rolling valley lands and is derived from interbedded fine-grained sandstone, shales, and limestones. It is very well suited to corn, grain, and forage crops. (Walker County, Ga.)

The position of Armuchee series in the key to the Appalachian Mountains and Plateaus province is as a leg attached to the Conasauga leg under "Shale and sandstone with some interbedded limestone," Brown soil—Red subsoil.

*Dekalb silty clay loam.*—The surface soil of this type is a light-brown to yellowish-brown heavy silt loam to silty clay loam, 4 to 8 inches deep. The subsoil is a compact, brittle, yellow silty clay loam to silty clay. On the steeper slopes fragments of the fine-grained sandstone and shale from which the type is derived are of common occurrence. The type occupies gentle to steep slopes, the crests of ridges, and the tops of hills. Grass gives only moderate returns. Corn and small grains do fairly well, as do also certain varieties of apples. (Clarksburg area, West Virginia.)

*Upshur silty clay loam.*—The surface soil is a grayish-brown to light-red silty clay loam, 8 to 12 inches deep. The subsoil is a heavy red silty clay loam to silty clay, which at a depth of about 24 inches changes into an Indian-red heavy, plastic clay. While the surface color is often grayish the subsoil has the typical red of the Upshur series. The type is developed mainly on comparatively low hills, the topography being somewhat less rolling than that of the Upshur clay. The type is derived from red shales and fine-grained sandstone, with some gray shales. It is well suited to apples, bluegrass, corn, and wheat. Yields are not quite so heavy as those secured from the Upshur clay, but are considerably better than those from the Dekalb silt loam. A number of vegetables can be grown with fair success. (Point Pleasant area, West Virginia.)



*Westmoreland silty clay loam.*—The surface soil is a grayish-brown to light-brown silty clay loam, 4 to 10 inches deep. The upper subsoil is a yellow silty clay loam. This quickly grades into yellow silty clay, somewhat sticky and plastic. Sometimes the lower subsoil has an olive green color, especially close to the underlying limestone. Where the type overlies limestone the texture averages heavier, those areas derived mainly from the limestone and not markedly influenced by material from the associated shales and sandstones really representing local developments of Brooke silty clay loam. The typical soil is derived from interbedded, fine-grained sandstone, shale, and limestone. It occupies principally smooth slopes and has excellent drainage. The type is a very valuable soil, being suited to corn, small grains, bluegrass, timothy, and clover. Much of it is used for bluegrass pastures, and affords excellent grazing. (Clarksburg area, West Virginia.)

#### SUBORDINATE TYPES.

*Dekalb loamy sand.*—This type consists of a light-brown loamy sand, underlain to an average depth of 8 inches by pale yellow loamy sand, where it changes to a light sandy loam, becoming coarser with increase in depth. Areas of this type are developed on or near the crest of ridges. These are excessively drained. The type is derived from coarse-grained sandstone. Where liberal quantities of vegetable matter are incorporated with the soil and moderate applications of fertilizers are made, fair yields of corn, wheat, oats, rye, and a number of vegetables are secured. (Point Pleasant area, West Virginia.)

*Hanceville stony loam.*—The surface soil is a light-brown to reddish-brown heavy fine sandy loam to light loam, 8 to 10 inches deep. The subsoil is a red clay loam or fine sandy loam of friable structure. Fragments of ferruginous red sandstone are so abundant as to interfere materially with cultivation. The type is confined mainly to slopes. It is derived from ferruginous sandstone. It is best suited to forestry. (Walker County, Ga.)

*Westmoreland stony loam.*—The surface soil is a light-brown silt loam to silty loam, about 10 inches deep. The subsoil is lighter in color than the soil, and contains a higher percentage of clay. It grades into a silty clay loam, which rests upon rock at about 2 to 3 feet. Small sandstone fragments are present in the soil in sufficient quantities to interfere with cultivation. The type occupies the crests of hills, narrow ridges, and steep slopes, where erosion is often destructive. Drainage is good to excessive. Peaches give good results. Where the surface admits of proper cultivation, corn yields from 50 to 80 bushels per acre; wheat, 12 to 25 bushels; oats, 20 to 40 bushels;



and hay, 1 ton to 2 tons. In dry seasons the yields are considerably reduced. (Washington County, Pa.)

#### RIVER FLOOD PLAINS PROVINCE.

##### SANDS.

*Cahaba sand*.—The surface soil is a light-brown to brown rather loamy sand. The subsoil is a light-brown or yellowish-brown loamy sand, the content of silt and clay increasing with depth. The lower subsoil frequently has a reddish tinge. Below 36 inches the material becomes a reddish-brown sandy loam, sometimes grading into a sandy clay and having characteristics similar to those of the Orangeburg subsoil. The type occupies comparatively high terraces and has an undulating surface. Drainage is for the most part good. This is a productive soil, giving, under good management, as much as 1 bale of cotton per acre. Corn, forage, oats, and a number of vegetables do well. (Pike County, Ala.)

*Sarpy sand*.—This type consists of a brownish-yellow to yellowish-brown light sandy loam to rather loose sand, about 4 to 8 inches deep, underlain by a loose sand, faintly mottled with shades of yellow and brown. In typical areas the sand continues to a depth of 3 feet or more, but in some cases a silty clay loam or clay is encountered in the lower part of the profile. This soil also occurs in a mixed phase with the Sharkey soils. Such "mixed land" is characterized by hummocks or small mounds of sand ("sand blows") of Sarpy sand and intervening depressions of Sharkey soils, so intermingled that separation is impracticable. The hummocks are more or less rounded in shape and range from 8 to 15 inches above the bottoms of the depressions. Between the typical Sharkey clay in the center of the depressions and the typical Sarpy sand in the center of the mounds there are frequently gradational types or phases of these soils. The uneven surface of such areas interferes with cultivation, but nevertheless they are used for farming. The typical Sarpy sand is of rather low agricultural value, being deficient in humus and retentive of moisture. By keeping the soil liberally supplied with organic matter and with liberal applications of fertilizers good crops of melons, sweet potatoes, Irish potatoes, and a number of vegetables can be secured. Where the depth to clay is 3 feet or more the general farm crops ordinarily give poor results. (Pemiscot County, Mo.)

##### FINE SANDS.

*Sarpy fine sand*.—This type consists of light-brown to grayish-brown fine sand, sometimes containing minute mica flakes, resting on a subsoil of yellowish-brown fine sand, in places faintly mottled with shades of brown. The type is developed on natural levees along



stream courses and bayous. It is highest nearest the stream front, sloping gradually away to blend with heavier types. Cotton, corn, oats, cowpeas, and a number of vegetables do fairly well, especially where the organic-matter content is maintained and the soil occasionally manured or fertilized. (Jackson County, Mo.)

## SANDY LOAMS.

*Bibb sandy loam.*—This type consists of nearly white to ashy gray moderately coarse sand, underlain by somewhat plastic sandy clay of a grayish color, frequently mottled with yellowish. It occupies first bottoms of streams. It is subject to frequent overflow and is poorly drained. Grasses give better results than other crops. (Pike County, Ala.)

*St. Catherine sandy loam.*—This type to a depth of about 10 inches consists of a medium to rather fine sandy loam or sand of a yellowish color. Below this depth the subsoil consists of about the same material, though occasionally grading into sticky sandy loam at 30 inches. Gravel is present usually in both soil and subsoil. The type occurs along the foot of loess bluffs as narrow strips having a slight slope toward the contiguous true alluvium. It is derived from wash from the Lafayette and Port Hudson formations and includes very little loess. The soil is inclined to be droughty. Early vegetables are the best crops to grow. (Adams County, Miss.)

The proper place for the St. Catherine series in the key to the River Flood Plains province is under the heading, "Coastal Plain material," attached to the "Drainage well established" leg as follows: Yellow soil—Yellow subsoil—Outwash from Lafayette and Port Hudson lying under loess.

*Genesee sandy loam.*—This type consists of a yellowish-brown sandy loam, about 9 inches deep, overlying a light-brown or yellowish sandy loam subsoil. Stratified sand and fine gravel not infrequently appear in the subsoil and sometimes extend to the surface. The type usually occupies level areas in the first bottoms of streams and is subject to more or less overflow. It is easily cultivated, and adapted to corn, oats, hay, and potatoes. (Erie County, Pa.)

## FINE SANDY LOAMS.

*Bibb fine sandy loam.*—This type consists of a light-gray fine sandy loam, underlain by gray fine sandy clay mottled with yellow. It represents first bottom alluvial material derived principally from noncalcareous Coastal Plain soils. It is subject to frequent overflow. Drainage and applications of lime are needed to bring the land into proper farming condition. A number of wild grasses and lespedeza flourish, affording good pasturage. (Lauderdale and Noxubee Counties, Miss.)



*Miller very fine sandy loam.*—The surface soil consists of a pinkish-red or chocolate-red friable very fine sandy loam, with a depth of 20 to 30 inches or more. The subsoil may consist of darker colored material or there may be very little change in the material from the surface downward throughout the 3-foot profile. Cotton, corn, and alfalfa should do well. (Concordia Parish, La.)

*Wabash very fine sandy loam.*—This type consists of a nearly black or black friable very fine sandy loam, rich in organic matter, overlying, at a depth of about 18 or 20 inches, lighter colored and somewhat heavier material. It mellows readily with little tendency to clod and is a desirable, productive soil, adapted to vegetables like cabbage, onions, and potatoes. Corn and oats should give fair yields. (Concordia Parish, La.)

*Yazoo very fine sandy loam.*—The surface soil is a light-brown or grayish-brown, rather loose, very fine sandy loam, ranging in depth from about 8 inches to 20 inches. The subsoil is a brown or light-brown very fine sandy loam, more or less mottled with rusty brown. The type is typically and mainly developed along river fronts, where it occupies well-drained natural levees. It is easily tilled, but requires frequent replenishment of organic matter in order to supply crops with sufficient moisture during dry spells. A number of vegetables do well. Corn and cotton make fair yields. (Concordia Parish, La.)

#### LOAMS.

*Buckner loam.*—The surface soil is a dark-brown to nearly black loam, 12 to 15 inches deep. The subsoil is brown but lighter in color than the surface soil. It is also often lighter in texture than the soil. The type is developed on terraces of flat-topped ridges and is essentially a second bottom soil. It is well suited to cotton, corn, grain, and forage crops. (Jackson County, Mo.)

The position of the Buckner series in the key to River Flood Plains province is under the head "Loessial material"—"Drainage well established" as a separate leg, as: Black soil—Brown subsoil—Second bottom.

#### SILT LOAMS.

*Altavista silt loam.*—This type consists of a gray to yellow compact silt loam to silty clay loam, underlain by a compact yellow silty clay, mottled slightly in the upper portion with red and in the lower portion with gray. The type is alluvial in origin and occupies well-defined terraces lying above normal overflow. Drainage is needed over most of the type, as the flat surface favors the standing of rain water. Properly drained, fertilized, and cultivated, good yields of grass, corn, wheat, and oats are secured. (Granville County, N. C.)



*Buxin silt loam.*—The type represents a shallow covering of reddish silt loam of Miller material overlying stiff, plastic, mottled drab, bluish, and brown clay of Sharkey material. With reclamation it should prove a very fine soil for corn, cotton, and probably for alfalfa. (Concordia Parish, La.)

The position of the Buxin series in the key to River Flood Plains province soils is under the heading "Residual Prairie material," attached to the "Drainage poorly established" leg as follows: Red soil (Miller material)—Mottled drab, bluish, and brownish plastic subsoil (Sharkey material).

*Congaree silt loam.*—The surface soil is a brown, reddish-brown, or chocolate-brown silt loam. The subsoil differs little from the soil until a depth of about 24 inches is reached, where it usually is a friable brown silt loam of somewhat lighter color and more or less mottled with shades of brown. Strata or pockets of sandy material are frequently encountered in various parts of the soil section. The type is a first-bottom, alluvial soil and subject to overflow. It is admirably adapted to corn, oats, forage crops, and grass. Cotton also does well under favorable seasonal conditions. (Granville County, N. C.)

*Elk silt loam.*—This type consists of a grayish to light-brown silt loam soil, 6 to 12 inches deep, underlain by a compact silt loam subsoil of a lighter color than the surface. In the lower portion, where the texture is usually a silty clay, the material is sometimes faintly mottled with yellowish and grayish colors. At about 4 feet gravelly material is frequently encountered. The type occurs on second terraces lying largely above overflow. The surface is sometimes flat and drainage poor. Much of the type should be ditched or tiled. Corn, with the usual methods of culture, yields from 15 to 30 bushels, wheat 10 to 15 bushels, oats 15 to 25 bushels, and hay 1 ton to 1½ tons per acre. (Rockcastle County, Ky.; Cape Girardeau County, Mo.; Washington County, Pa.; and Clarksburg area, West Virginia.)

*Holly silt loam.*—The surface soil is a gray to light-brown silt loam, 6 to 8 inches deep. The subsoil is a compact gray silt loam, mottled with yellow and brown, the lower portion being more intensely mottled, bluish and drab colors being frequently prominent. The type is rather clammy and cold-natured, remaining in a soggy condition throughout a good part of the year. It occurs in the first bottom of streams and is subject to frequent overflow. Grass, especially redtop and a number of wild water-loving varieties, afford good grazing and make fair yields of hay. Corn and oats do well in seasons of normal rainfall, especially where the drainage has been improved by ditching or tiling. (Walker County, Ga.; Rockcastle County, Ky.; and Cape Girardeau County, Mo.)



## CLAY LOAMS.

*Sharkey clay loam.*—The surface soil varies from dark-brown heavy loam to light-brown or grayish-brown light clay loam. The subsoil is a plastic clay loam or clay mottled drab, bluish, and rusty brown. The type represents in places a gradational soil between the Yazoo or higher lying and lighter textured river front soils and the heavy Sharkey clay. The topography ranges from flat to slightly ridgy, being cut in places by old stream channels. The type is well adapted to corn, cotton, sugar cane, and rice. (Adams County, Miss.)

*Congaree silty clay loam.*—This type is composed of a brown to reddish-brown silty clay loam soil, underlain by a subsoil slightly lighter in color but very nearly the same in texture, except in occasional strata of sandy material, encountered especially in its lower portion. Particles of mica are frequently present throughout the soil mass. The type occupies first bottoms of streams, and consists of alluvial material derived mainly from the Piedmont. It is subject to overflow. A considerable proportion of the type can be successfully used for corn, grass, oats, and forage crops, overflow not being frequent enough to make this unprofitable. Other areas may be reclaimed. (Cabarrus County, N. C.)

*Genesee silty clay loam.*—This type is characterized by brown or grayish silty clay loam soil, averaging about 8 inches deep, underlain by drab, brown, or reddish-brown, mottled, compact clay. The topography is level, the areas occupying first bottoms along streams, where the materials have been deposited by comparatively recent overflows. The surface drainage and underdrainage are both poor. When drained the type is very well adapted to the grasses and to corn, oats, and wheat. The native trees are chiefly elm and soft maple. (Ontario and Erie Counties, N. Y.)

*Sarpy silty clay loam.*—The soil is a brown or dark-brown silty clay loam, with an average depth of 15 inches. The subsoil is a light-brown very fine sandy loam, usually mottled faintly with rusty brown or yellow. The type is developed typically in positions intermediate between the higher front-land Yazoo soils and the lower heavier Sharkey soils or upon slight ridges. It has very fair natural drainage, owing to its light subsoil and slightly elevated position. The type owes its origin to deposition of silty clay loam over the lighter textured material of old sandbars or sandy front lands. Cotton, corn, and oats give fair yields. Alfalfa should do well. (Concordia Parish, La., and Pemiscot County, Mo.)

*Sharkey silty clay loam.*—The surface soil consists of 10 or 12 inches of light-brown or brown heavy silt loam to silty clay loam,



often slightly mottled with rusty brown. The subsoil ranges from heavy very fine sandy loam through silt loam to silty clay loam, and usually has a light-brown color, mottled with drab and rusty brown and in places with bluish-gray. Fairly good yields of corn and cotton are secured. Protected from overflow and properly cultivated, heavy yields of a number of crops would be secured. Cabbage, grass, and rice should do well. (Adams County, Miss., and Pemiscot County, Mo.)

*Tyler silty clay loam.*—This type consists of a gray to grayish-brown compact silty clay loam, underlain at about 10 to 12 inches by a rather plastic silty clay of grayish-brown or pale-yellow color, sometimes mottled with gray in the lower portion. The material represents old alluvium occurring on second terraces and in some cases in abandoned stream valleys. The type is sometimes called "crawfish" land. It is a rather clammy, cold-natured soil of moderate productiveness. The type is best suited to grass. With liming, liberal incorporation of vegetable matter, and the establishment of good drainage conditions, general farm crops, such as corn, wheat, and oats would give moderate to good yields. (Point Pleasant area, West Virginia.)

*Yazoo silty clay loam.*—The surface soil is a brown silty clay loam, with an average depth of 18 inches. The subsoil is a light-brown very fine sandy loam to silty clay loam, mottled with rusty brown, yellowish, and sometimes bluish colors. The type occupies an intermediate position between the sandier Yazoo front lands and the heavy Sharkey clay of the lower back lands of the Mississippi flood plains. Owing to its position and the sandy or fine sandy texture in many areas, it usually has good drainage. Where the subsoil is heavier ditches or tile drains are necessary. The type gives good yields of corn, oats, and cotton. (Concordia Parish, La.)

#### CLAYS.

*Kalmia clay.*—This type of soil consists of a thin mantle of grayish or yellowish compact very fine sandy loam to silty loam, resting upon yellow very fine sandy to silty clay, which in the lower portion is mottled with grayish and reddish colors. It occupies second terraces of streams and lies above overflow. The type is rather difficult to cultivate, but when brought into good tilth gives fair yields of oats, corn, cotton, and forage crops. (Clarendon County, S. C.)

*Sarpy clay.*—The surface soil consists of a yellowish-brown to grayish-brown, or sometimes drab, heavy compact silty clay, ranging from about 15 to 24 inches in depth. The subsoil is a silt loam to very fine sandy loam of a friable structure. Rusty-brown and drab



mottlings are common in the surface soil and subsoil. The type is developed in depressions and flat areas in the river bottoms. Corn is grown with success on this soil where drained, giving yields of 50 to 75 bushels per acre. On thoroughly drained areas alfalfa would probably do well. (Pemiscot County, Mo.)

*Yazoo clay*.—The surface soil to a depth of 20 inches is a brownish clay, faintly mottled with grayish, reddish, or rusty brown. The subsoil is a dark-drab or gray very fine sandy loam to silty clay loam, mottled with brown or rusty-brown. The surface is usually level or gently sloping. Notwithstanding the light textured subsoil, ditches are usually needed to carry off the surplus water after heavy rains. Fine yields of corn, cotton, and rice are secured. Sugar cane and alfalfa should do well. (Concordia Parish, La.)



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